

Memo



Date: August 10, 2015
To: Kevin Stewart
From: Markus Ritsch
Subject: July 2015 ALERT Data Analysis

I. ALERT Data Source

Raw ALERT data records extracted from the Urban Drainage and Flood Control District's NovaStar 5 base station were analyzed for the period July 1 through July 31, 2015.

II. General System Analysis Summary

In 2015 data will be received at the District through both the legacy ALERT channel and through the ALERT2 (concentrator plus A2 self-reports) channel. The following (Table 1) quantifies the data reports received by each channel.

Table 1. Reception of Data at Diamond Hill (Legacy, ALERT2 and Concentrator Reports)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Legacy	216,461	241,285	268,551	282,306	345,191	348,979	284,647					
Concentrator	366,229	405,210	443,612	458,979	499,841	511,002	449,469					
ALERT2	172,927	233,617	286,836	295,399	319,764	302,746	320,675					
TOTAL	755,617	880,112	998,999	1,036,684	1,164,796	1,162,727	1,054,791	0	0	0	0	0
Conc+A2	539,156	638,827	730,448	754,378	819,605	813,748	770,144					
Conc/Leg	1.69	1.68	1.65	1.63	1.45	1.46	1.58					
DataChron	529,216	564,798	652,811	702,865	777,203	772,052	742,221					

The District operates two redundant NovaStar5 base stations: the primary (ns5a) at Diamond Hill and a redundant base (ns5b) at Greenhouse Data. Additional analyses are conducted on the data received by these two base stations (Table 2). The data received by both base stations for the month are shown below.

Table 2. Comparison of Data Reception by ns5a and ns5b

NS5A (Diamond Hill)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Legacy	216,461	241,285	268,551	282,306	345,191	348,979	284,647			
Concentrator	366,229	405,210	443,612	458,979	499,841	511,002	449,469			
ALERT2	172,927	233,617	286,836	295,399	319,764	302,746	320,675			
NS5B (Greenhouse)										
Legacy	244,232	241,143	268,417	262,549	341,926	341,600	288,199			
Concentrator	409,951	405,875	444,660	430,407	499,657	502,908	456,087			
ALERT2	191,784	234,150	289,044	275,955	319,750	299,635	328,435			
Diff (NS5a-NS5b)										
Legacy (Digi One)	-27,771	142	134	19,757	3,265	7,379	-3,552			
Concentrator (B2010)	-43,722	-665	-1,048	28,572	184	8,094	-6,618			
ALERT2 (B2010)	-18,857	-533	-2,208	19,444	14	3,111	-7,760			
Comments	Failed hard drive on ns5a		Tot A2 diff 1%	Outage on ns5b this month			Ns5a data collection was down on July 1			

The total difference in reports received by Diamond Hill and Greenhouse is not minimal. The Greenhouse server received more reports than did Diamond Hill. Data collection was down on the ns5a server the morning of July 1 from midnight to 9:30 AM. The Novastar5 software at Diamond Hill did not create a partition table for the month of July during the June-July boundary and thus no data was collected at Diamond Hill until it was detected by WET on the morning of July 1.

The daily ratio of total concentrator reports received versus total legacy ALERT reports received is shown (Figure 1).

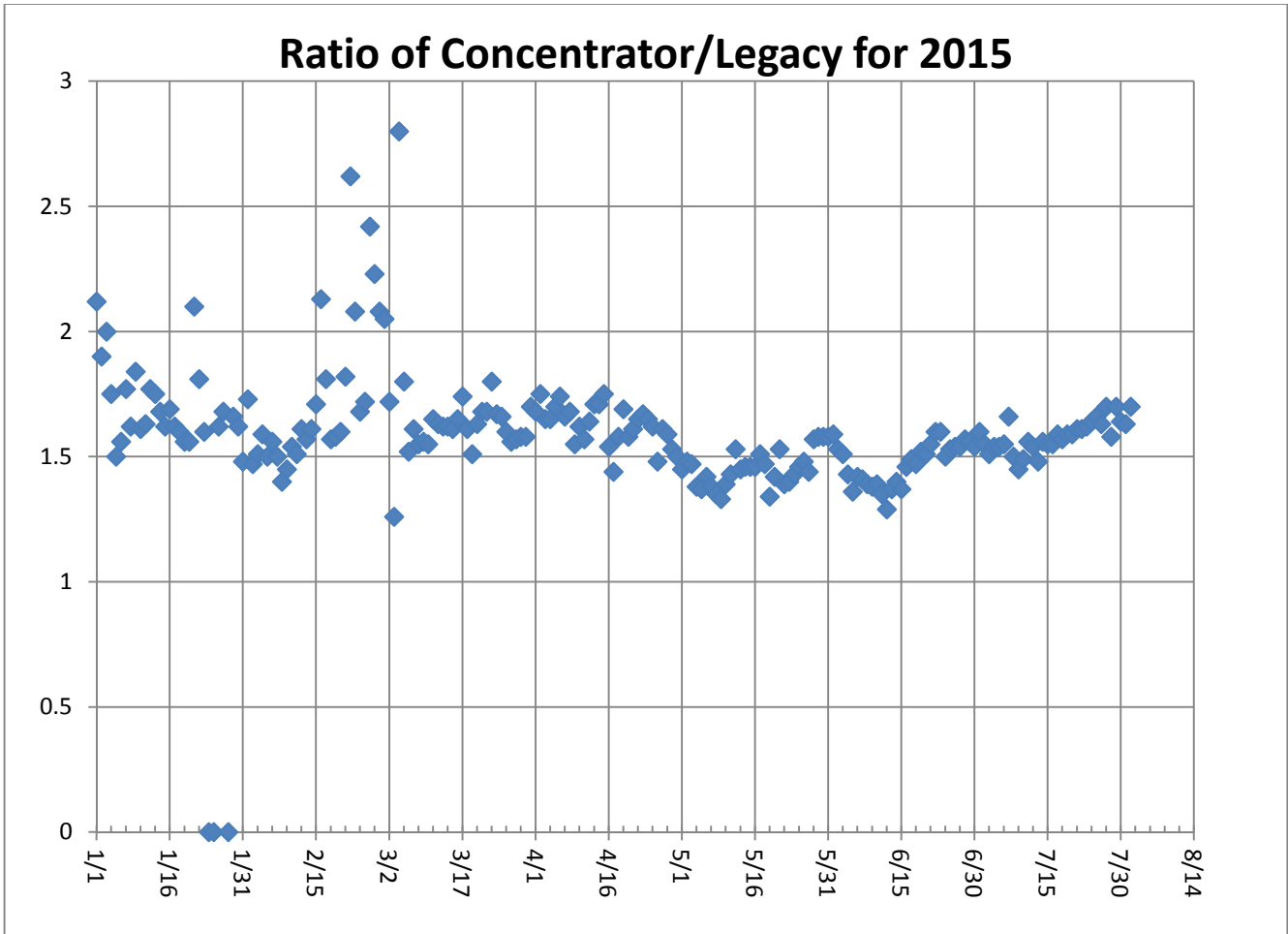


Figure 1. Daily Ratio of Concentrator Reports to Legacy Reports

The ratio is very consistent throughout the month. The ratio seems to fluctuate around 1.5.

A. Continuous Operation of Base Receiver/Decoder

The ns5 base stations were NOT in continuous operation for the entire month. Data collection was down on the ns5a server the morning of July 1 from approximately midnight to 9:30 AM. Although ns5a was down the backup ns5b server in Wyoming was collecting data during this period.

Network issues affecting the collection of legacy and ALERT2 data on ns5a and ns5b were evident on July 17th and July 24th.

B. Specific Issues Identified this Month

Performance of the following sensors (Table 3) was questionable this month.

Table 3. Sensors with Poor Performance Characteristics

Sensor ID	Description	Comments
2330	Morrison	Poor timer performance and poor event performance
430	Utah Park	Poor timer performance and poor event performance
1570	Wx-Brighton Ditch	Under reporting rain, lowest rain total four months in a row
1340	Sanderson at Xavier	Under reporting
2360	Indian Hills	Poor timer performance and poor event performance
2271, 2272, 2274	Unknown IDs	Cub Creek below Blue (2270)
4469	Unknown ID	Received more than 400 reports from this unknown sensor
4130	Swiss Peaks	Reported no rain for the entire month
630	Temple Pond at DTC	Over reporting rain (influence by irrigation)
713	Horseshoe Park Drop	Very noisy stage sensor
1103	Louisville Rec Ctr	Very noise stage sensor
853	Flying J	Very noise stage sensor
413	Kelly Dam	Very noise stage sensor
333	Van Bibber @ Hwy 93	Very noise stage sensor

Two ALERT2 sensors reported empty data values in the month of July. These sensors include Newlin Gulch stage (3073) and Magnolia dew point (6609). The Newlin Gulch stage reports were missing from July 1 through July 9th and the Magnolia dew point is missing only on July 15th. The Newlin Gulch station was moved in the early part of the month and a new PT had to be ordered. The new PT was installed on July 9th.

C. Performance of New A2 Sites

This section of the report will look at specific reporting characteristics of the new A2 sites by analyzing their APDUID (Application PDU Identifier). The APDUID is a cyclical, incrementing counter from 0 to 6. Tracking skipped values and restarts of the application control byte counter provides useful insight into site performance and general network health. The performance of the cyclical counter is quantified for each A2 self-reporting site and repeater path (Table 4).

Table 4. APDUID Performance of A2 Sites by Source Address

Description	ID	W. Creek (6001)	Smoky Hill (6502)	Blue Mt. (6503)	Lee Hill (6505)	Gold Hill (6506)
Carr Street (10012)	100		0.939	0.970	0.783	0.869
Murphy Creek (10019)	870		0.992	0.993	0.993	0.989
Maple Grove (10013)	1000		0.979	0.983	0.990	0.980
Lena @ Nolte Pond (10025)	1020		0.935	0.987	0.987	0.953
Newlin Gulch	3070		0.909	0.272	0.866	0.345
Heritage Regional Park	3090		0.474	0.306	0.481	0.620
Lower Left Hand (10018)	4453		0.988	--	0.998	--
Magnolia	6602		0.982	0.960	0.997	0.995
Blackstone**	100100		0.121	0.160	0.150	0.143
ETG @ Hampden**	100110		0.143	0.143	0.143	0.139
Upper Sellers	100140	0.916				
Haystack Road	100150	0.970				
Sand Cr at Colfax	100160		0.991	0.973	0.988	0.978
James Creek	100177		0.272	--	0.995	0.923
S. St. Vrain at Berry Ridge	100210		--	--	0.993	0.014
Arvada/Blunn Reservoir	100227		0.923	0.923	0.923	0.770
Havana Pond	100237		0.997	0.993	0.995	0.993
Westerly Creek Dam	100247		0.974	0.971	0.974	0.972
Trumbull (Hayman)	100260	0.808	--	--	--	--
West Creek (Hayman)	100270	0.908	--	--	--	--

**-the APDUID is disabled for these sites.....these are original HSE A2 transmitters and may not support the APDUID

The Heritage Regional Park (3090) has an issue with the cyclical APDUID counter as the transmitter seems to skip a count value. WET will investigate in August.

D. ALERT2 Repeater Loading

The ALERT2 architecture utilizes 5 repeaters with a single transmit frequency (170.300 MHz) to Diamond Hill. The repeaters utilize a 20 second frame where each repeater is allocated a slot of specific size and an offset within the frame. The slot allocated to each repeater is sized appropriately to accommodate the total number of existing and future remote sites routed through that repeater. Each repeater is shown along with its designated slot (Table 5). Currently there is no pass-listing for the ALERT2 repeaters. Any remote ALERT2 site can be received by all repeaters and re-broadcast to the base except for West Creek which has an input frequency unique to Douglas County.

Table 5. ALERT2 Repeater Architecture

Repeater	Slot Size (sec)	Slot Offset (sec)	Source Address	ALERT2 Input Frequency (MHz)	ALERT2 Output Frequency (MHz) – received at Diamond Hill
West Creek	2	0	6001	169.425	170.300
Smoky	3	2	6502	169.525	170.300
Blue Mt.	4	5	6503	169.525	170.300
Lee Hill	3	9	6505	169.525	170.300
Gold Hill	3	12	6506	169.525	170.300
Magnolia	5	15	6507		170.300
Frame Size	20				

The following tables summarize the total number of reports received through each repeater (Table 6) and the distribution of reports by time slot (Table 7). This quantifies repeater loading for the ALERT2 backbone.

Table 6. ALERT2 Reports Received through Each Repeater

Month	West Creek (6001)	Smoky (6502)	Blue Mt. (6503)	Lee Hill (6505)	Gold Hill (6506)	TOTAL
Jan	0	44,501	44,636	44,783	39,007	172,927
Feb	0	58,543	56,150	61,160	57,764	233,617
Mar	346	73,198	69,604	77,968	65,323	286,439
Apr	595	73,711	69,568	79,215	72,310	295,399
May	5,259	78,694	72,340	86,297	77,174	319,764
June	11,987	72,449	65,742	82,998	69,570	302,746
July	28,595	75,379	71,394	79,026	74,041	328,435

Table 7. Messages Received by Time Slot (Only A2 Self Reports)

Tot	West Cr. (6001)		Smoky (6502)				Blue Mt. (6503)				Lee Hill (6505)			Gold Hill (6506)			Magnolia (6507)				
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
Jul	10294	6951	14614	26531	14404	21533	28204	9074	3133	5401	5888	1355	5107	3636	272	124	91	72	59	62	
	1046	1414	3537	4139	436	2572	2931	1196	403	5381	3912	789	4188	2354	593	203	126	94	82	64	
	53	58	3979	5152	1498	3801	3189	721	227	18404	31011	7608	28768	23995	5535	1208	457	235	137	134	
328,435	11,393	8,423	22,130	35,822	16,338	27,906	34,324	10,991	3,763	29,186	40,811	9,752	38,063	29,985	6,400	1,535	674	401	278	260	

The following tables summarize the system-wide latency of ALERT2 self-reports (Table 8 and Table 9). The latency is computed as the difference in seconds between the reception time of an ALERT2 self-report at the base station and the report time stamp issued by the transmitter.

Table 8. System-Wide Latency of ALERT2 Self-Reports (seconds)

Statistical Parameter	Value	Comments
Mean	59.75	The average time it took a report from the field to reach the base
Minimum	4	The minimum time it took for a report to go from the field to the base
Maximum	1093	The maximum time it took for a report to go from the field to the base

Table 9. Summary of ALERT2 System-Wide Latency (seconds)

Statistical Parameter	Feb	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	340	35.7	44.04	38.14	34.23	59.75					
Minimum	5	3	3	3	3	4					
Maximum	35,209	3,706	43,089	205	245	1,093					

The large latencies (more than 1,000 seconds) were observed from Murphy Creek GC, Magnolia, Lena @ Nolte, Sand Creek at Colfax going through the Smoky (6502), Blue Mt. (6503), Gold Hill (6506) and Lee Hill (6505) on July 24th. Large latencies (more than 380 seconds) were also observed on July 17th.

E. Rain Sensor Timer Reporting Summary

The following analysis assumes that each legacy rain sensor has a 12-hour timer-reporting interval and each A2 rain sensor has a 1-hour timer-reporting interval. The worst performing rain sensors for the month are summarized (Table 10).

Table 10. Monthly Summary of Sensors with Poor Timer Performance (Sensor ID)

Jan*	Feb*	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct*	Nov*	Dec*
4470	4470	4470	4850	2330	430	2330					
700	2330	4270	2330	310	2330	2360					
2330	4870	2790	430	2360	3010	1570					
4240	3010	4240	5720	430	2360	430					
3010	1660	4870	2970	4470	310	2850					
4870	4240	3010	2360	4870	1660	1660					

*- Only sensors that operate year-round (weather stations and stations in Boulder County) are included for the analysis in these months.

Sensors identified as having poor timer performance in multiple months are shaded with unique colors. A developing trend can thus be identified from the color shading as the year progresses.

III. Rain Sensor Event Reporting Summary

A. District-Wide Total Tip/Count Statistics

The incrementing reports from all 1-mm rain sensors were analyzed to quantify the District-wide statistical total monthly tip summary (Table 11). For the months of January, February, March, October, November and December only the stations that operate year-round are included in the rain event analysis. These stations include all weather stations and the stations in Boulder County.

Table 11. District-Wide Total Tip/Count Statistical Summary

Statistical Parameter	Value	Comments
Mean	54.59	Only the 1-mm rain sensors were included in the analysis
Median	53	Only the 1-mm rain sensors were included in the analysis
Standard deviation	24.79	Only the 1-mm rain sensors were included in the analysis
Mean plus three standard deviations	128.96	Only the 1-mm rain sensors were included in the analysis
Mean minus two standard deviations	5.02	Only the 1-mm rain sensors were included in the analysis
Minimum total count	1	Sanderson at Xavier (1340)
Maximum total count	127	LDC at 64th (1310)
Sensors showing NO rain for the month		Brighton ETO (1570) and Swiss Peaks (4130)
Sensors greater than 3 SD (over reporting)		None
Sensors less than 2 SD (under reporting)		Sanderson at Xavier (1340)

B. Monthly Average Tip/Count Summary

A monthly summary of the District-wide mean total tip/count is presented (Table 12).

Table 12. Monthly Summary of District-Wide Mean Total 1-mm Tip/Count

Year	Jan*	Feb*	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct*	Nov*	Dec*	Ave
2006	4.62	5.92	18.39	20.47	19.44	13.75	74.03	46.89	24.17	41.13	5.04	16.45	24.19
2007	11.56	5.40	29.75	65.03	68.30	15.87	36.20	46.38	22.13	29.50	6.54	11.29	29.00
2008	4.05	7.38	12.26	20.57	54.82	26.06	16.43	90.20	37.54	19.59	2.82	9.24	25.08
2009	6.33	3.11	11.37	59.26	63.45	68.00	65.00	20.00	27.29	30.24	11.00	5.60	30.89
2010	5.97	11.90	32.54	70.57	39.63	56.04	50.23	31.01	4.18	18.31	8.30	3.31	27.67
2011	6.78	7.45	7.54	33.94	92.68	39.42	90.87	18.25	37.67	25.73	10.41	13.59	32.03
2012	4.89	13.57	2.35	30.17	38.97	19.35	73.03	11.31	48.81	22.32	2.98	4.18	22.66
2013	2.96	14.31	21.86	35.96	45.87	16.39	52.33	50.63	229.74	29.64	5.86	4.00	42.46
2014	6.88	11.86	25.91	29.30	77.30	29.16	99.73	43.59	50.96	29.26	13.36	8.11	35.45
2015	9.88	24.42	20.78	69.75	143.07	86.93	54.59						

*- Only sensors that operate year-round (weather stations and stations in Boulder County) are included for the analysis in these months.

C. Sensors with a Jump of Six or More in the Sequential Count

Several sensors experienced a large jump in the sequential tip count (Table 13).

Table 13. Sensors with a Jump of 6 or More in Sequential Count

Sensor Description	Sensor ID	Comment
Utah Park	430	
Hanson Rain	4330	
Lee Hill Rain 2012	4320	

D. Sensor-by-Sensor Incrementing Count Summary

The system-wide reception rate of incrementing, 1-mm tip reports for the month was approximately 94 percent. A total of 9,233 incrementing reports were received and a total of 9,827 reports were expected. The total loss of incrementing reports for the month was approximately 6 percent. Those sensors with the worst event transmission performance are summarized (Table 14).

Table 14. Monthly Summary of Sensors with the Worst Performance

Jan*	Feb*	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct*	Nov*	Dec*
4470	2330	100150	100150	310	430	2790					
700	4470	4470	4240	1620	4470	430					
4750	700	2340	430	2330	2330	2360					
4330	2320	100140	100140	430	2970	4870					
2790	4330	1520	2330	2230	2230	2850					
4870	4870	1100	1620	4470	2360	2330					

*-Only sensors that are operational year-round (weather stations and stations in Boulder County) are included for the analysis in these months.

Sensors identified as having poor event performance in multiple months are shaded with unique colors. A developing trend can thus be identified from the color shading as the year progresses.

IV. Unknown Device Analysis – Received Data Log

The ALERT IDs present in the audio signal received by the decoder are compared against a list of “active” device IDs that are defined within NovaStar. Those IDs received by the decoder that are not defined within NovaStar are considered to be “unknown” and may be the result of radio noise or problems with the telemetry system. The reception of “unknown” device reports for the month is summarized (Table 15).

Table 15. Summary of Unknown IDs

Description	Concentrator	Legacy	A2
Total number of unknown IDs (IDs without a device definition)	206	239	0
Total reports from unknown IDs	1,179	1,156	0
Unknown IDs with only a single received report (potential noise)	71	59	0
Total reports from all IDs – RecData Log entire month	456,087	288,199	328,435
Unknown reports as a fraction of total reports	0.26%	0.40%	0%

The total number of reports from unknown sensors is very small relative to the total reports received for the month. Shown below (Table 16) are the total reports received from unknown sensor IDs for each month of the year.

Table 16. Monthly Summary of Total Reports from Unknown IDs (Concentrator)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	1,220	1,474	1,276	1,174	721	5,707	610	1,738	442	533	2,857	6,396
2011	1,231	2,165	3,065	1,254	2,051	439	489	456	191	683	747	861
2012	692	750	1,575	977	5,469	11,016	453	683	774	2,657	3,854	5,466
2013	4,265	994	1,100	2,589	3,623	6,973	5,230	1,070	4,429	781	13,459	1,213
2014	870	4,284	2,399	2,104	25,746	1,832	3,983	268	369	448	470	1,099
2015	542	9,137	1,524	1,007	946	699	1,179					

The fraction of reports from unknown sensors relative to the total number of reports is shown below (Table 17).

Table 17. Monthly Percent of Unknown Sensor Reports (Concentrator)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	0.42%	0.56%	0.38%	0.32%	0.20%	1.61%	0.17%	0.49%	0.13%	0.16%	0.93%	1.88%
2011	0.39%	0.73%	0.90%	0.37%	0.58%	0.12%	0.12%	0.05%	0.12%	0.18%	0.22%	0.26%
2012	0.30%	0.25%	0.43%	0.26%	1.37%	2.74%	0.11%	0.18%	0.20%	0.72%	1.15%	1.62%
2013	1.40%	0.31%	0.29%	0.60%	0.37%	0.61%	0.82%	0.21%	0.96%	0.31%	5.37%	0.23%
2014	0.14%	0.94%	0.40%	0.34%	3.95%	0.34%	0.66%	0.03%	0.03%	0.07%	0.11%	0.26%
2015	0.15%	2.25%	0.34%	0.22%	0.19%	0.14%	0.26%					

Any month shaded in yellow has an excessive number of reports from unknown sensors.

A number of “unknown” sensors had multiple reports, which may indicate the existence of a transmitter that is sending information on an ID that is not currently defined within NovaStar. The unknown IDs with multiple reports including the number of reports received by each are shown (Table 18).

Table 18. Reports Received by Unknown IDs

Concentrator		Legacy ALERT		Comment
Unknown ID	Reports	Unknown ID	Reports	
4469	445	4469	434	
2283	82	2283	82	Kinney Peak
1099	68	1099	63	
623	54	623	57	
2274	46	2274	48	Cub Creek below Blue
2272	39	2272	42	Cub Creek below Blue
2271	37	2271	40	Cub Creek below Blue

V. Sensors with Invalid Reports

The sensors below (Table 19 and Table 20) have the largest number of invalid decodes as determined by the validation process defined at the District NovaStar5 base station. These invalid reports may indicate poor radio paths (bit flip/contention errors/random decode) or validation criteria that do not match the physical installation at the site.

Table 19. Rain Sensors with the Most Invalid Reports

Sensor ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temple Pond at DTC (630)	0	0	0	0	0	0	113					
Bear Creek @ Lowell (1530)	5	6	2	1	15	9	0					
Pine Cliff Road (2810)	4	5	6	4	2	7	5					
Porphory Mtn (4850)	0	0	0	0	0	7	5					
East/West Trailhead (3050)	0	0	0	0	0	5	4					
Haskins Gulch (2820)	0	0	0	0	64	0	0					
Wx-West Creek (3020)	0	0	10	4	13	1	0					
Wx-Castle Rock (2750)	0	0	5	2	30	0	0					
A2-Newlin Gulch (3070)	0	0	0	6	35	2	0					

Table 20. Level Sensors with the Most Invalid Reports

Sensor ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Van Bibber @ Hwy 93 (333)	0	0	0	0	0	0	43					
Horseshoe Park Drop (713)	0	0	0	0	0	0	198					
Louisville Rec Ctr (1103)	0	0	0	0	0	0	94					
Pine Cliff Road (2813)	0	0	0	0	0	0	41					
Ferril Lake (1383)	666	667	725	720	261	0	0					
Kelly Dam (413)	0	0	0	0	61	70	47					
A2-Lena @ Nolte Pond (1023)	na	545	745	738	0	0	0					
Piney at Liverpool (953)	0	0	228	232	26	0	0					
Flying J (853)	0	0	52	60	60	58	61					
Sanderson at Xavier (1343)	0	0	31	7	15	26	6					
SPR at Henderson (1663)	0	0	0	0	0	0	18					
Little Narrows (4473)	33	208	2	8	11	24	7					

SPR at Dartmouth (1629)				49	58	3	0					
Murphy Creek GC (873)	0	0	0	0	36	1	0					
Marston Lake North (1523)	0	0	0	0	20	10	0					
Bridge (4423)	0	0	0	0	0	32	3					
SBC @ San Souci (4833)	0	0	0	0	0	26	1					
Sand Creek Park (1803)	0	0	0	0	0	23	1					

VI. Rainfall Alarms and Intensity Analysis

The following rainfall rate alarms from the Urban Drainage and Flood Control District NovaStar 5.0 Web Server were identified this month. A total of 79 alarms were triggered this month and 42 total tweets went out.

Sensor	Description	Alarm Type	Date
2260	Brook Forest Precipitation-JF	Jefferson County 10 minute rainfall	7/1/2015 14:39
5880	Hackett Mountain Precipitation-TL	Hayman 30 minute rainfall	7/1/2015 15:34
5880	Hackett Mountain Precipitation-TL	Hayman 1 hour rainfall	7/1/2015 15:40
5740	Trail Creek Precipitation-TL	Hayman 30 minute rainfall	7/1/2015 15:43
5740	Trail Creek Precipitation-TL	Hayman 1 hour rainfall	7/1/2015 15:46
5880	Hackett Mountain Precipitation-TL	Hayman 30 minute rainfall	7/1/2015 15:47
2990	Tomah Road Precipitation-DG	Douglas County 10 minute rainfall	7/1/2015 15:48
5740	Trail Creek Precipitation-TL	Hayman 90 minute rainfall	7/1/2015 15:52
5740	Trail Creek Precipitation-TL	Hayman 30 minute rainfall	7/1/2015 15:55
2990	Tomah Road Precipitation-DG	Douglas County 1 hour-1 Inch rainfall	7/1/2015 15:56
5880	Hackett Mountain Precipitation-TL	Hayman 30 minute rainfall	7/1/2015 15:57
2990	Tomah Road Precipitation-DG	Douglas County 10 minute rainfall	7/1/2015 15:59
5740	Trail Creek Precipitation-TL	Hayman 30 minute rainfall	7/1/2015 16:07
2940	Willow Creek Precipitation-DG	Douglas County 10 minute rainfall	7/1/2015 16:09
4790	Button Rock Precipitation-BO	Boulder County 10 minute rainfall	7/2/2015 18:57
4320	Lee Hill Rain Precipitation-BO	FMC-BA 0.25" in 10 Min Rainfall	7/2/2015 19:15
2840	Sulphur Gulch Precipitation-DG	Douglas County 10 minute rainfall	7/2/2015 20:41
4140	Logan Mill Precipitation-BO	FMC-BA 0.25" in 10 Min Rainfall	7/4/2015 15:53
5810	Stump Bump Precipitation-TL	Hayman 30 minute rainfall	7/4/2015 18:00
2250	Rosedale Precipitation-JF	Jefferson County 10 minute rainfall	7/5/2015 13:15
2250	Rosedale Precipitation-JF	Jefferson County 1 hour rainfall	7/5/2015 13:25
2250	Rosedale Precipitation-JF	Jefferson County 10 minute rainfall	7/5/2015 13:26
100260	Trumbull Fire Station Wx Precipitation	Douglas County 10 minute rainfall	7/7/2015 14:48
5940	Log Jumper Precipitation-DG	Hayman 30 minute rainfall	7/7/2015 14:53
5940	Log Jumper Precipitation-DG	Hayman 1 hour rainfall	7/7/2015 15:19
2970	Rampart Range Road Precipitation-DG	2970 Rampart Range Road 0.2" in 30 Minutes Rainfall	7/7/2015 16:15
2920	West Cherry Head Precipitation-DG	Douglas County 10 minute rainfall	7/9/2015 15:55
2920	West Cherry Head Precipitation-DG	Douglas County 1 hour-1 Inch rainfall	7/9/2015 16:04
4080	Twin Sisters Precipitation-BO	FMC-BA 0.50" in 30 Min Rainfall	7/9/2015 17:08
5860	Cedar Mountain Precipitation-TL	Hayman 30 minute rainfall	7/9/2015 17:10
4770	Cal-Wood Ranch Precipitation-BO	Boulder County 10 minute rainfall	7/9/2015 17:25
4160	Sunshine Precipitation-BO	FMC-BA 0.25" in 10 Min Rainfall	7/9/2015 17:40
4860	Fairview Peak Precipitation-BO	Boulder County 10 minute rainfall	7/9/2015 17:43
4850	Porphyry Mountain Precipitation-BO	FMC-BA 0.75" in 1 Hour Rainfall	7/9/2015 18:03
4850	Porphyry Mountain Precipitation-BO	FMC-BA 0.50" in 30 Min Rainfall	7/9/2015 18:05
1660	SPR at Henderson Precipitation	Plains 10 minute rainfall	7/9/2015 18:14
1660	SPR at Henderson Precipitation	Plains 1 hour rainfall	7/9/2015 18:21
1310	Little Dry at 64th Precipitation-AD	Plains 10 minute rainfall	7/9/2015 19:05
1310	Little Dry at 64th Precipitation-AD	Plains 1 hour rainfall	7/9/2015 19:12
1310	Little Dry at 64th Precipitation-AD	Plains 10 minute rainfall	7/9/2015 19:20
100	Carr Street Precipitation-JF-Arvada	Jefferson County 1 hour rainfall	7/9/2015 19:30
1310	Little Dry at 64th Precipitation-AD	Plains 10 minute rainfall	7/9/2015 19:31
200	Leyden Reservoir Precipitation-JF-Arvada	Jefferson County 10 minute rainfall	7/9/2015 19:46
1310	Little Dry at 64th Precipitation-AD	Plains 1 hour rainfall	7/9/2015 20:16

2970	Rampart Range Road Precipitation-DG	2970 Rampart Range Road 0.2" in 30 Minutes Rainfall	7/9/2015 21:00
1660	SPR at Henderson Precipitation	Plains 10 minute rainfall	7/10/2015 21:49
4040	Martin Gulch Precipitation-BO	Boulder County 10 minute rainfall	7/15/2015 15:53
940	Sampson Gulch Precipitation-AR	Plains 10 minute rainfall	7/15/2015 17:24
4320	Lee Hill Rain Precipitation-BO	FMC-BA 0.25" in 10 Min Rainfall	7/17/2015 10:59
850	Flying J Truck Plaza Precipitation-AD	Plains 10 minute rainfall	7/18/2015 15:17
830	Side Creek Park Precipitation-AR	Plains 10 minute rainfall	7/18/2015 15:29
970	Pump Station 3 Precipitation-AR	Plains 10 minute rainfall	7/18/2015 15:53
5740	Trail Creek Precipitation-TL	Hayman 30 minute rainfall	7/19/2015 15:34
5740	Trail Creek Precipitation-TL	Hayman 30 minute rainfall	7/19/2015 15:48
5730	West Creek Precipitation-TL	Hayman 30 minute rainfall	7/19/2015 16:01
630	Temple Pond at DTC Precipitation-DN	Plains 10 minute rainfall	7/21/2015 13:43
630	Temple Pond at DTC Precipitation-DN	Plains 1 hour rainfall	7/21/2015 13:58
5940	Log Jumper Precipitation-DG	Hayman 30 minute rainfall	7/21/2015 14:10
2970	Rampart Range Road Precipitation-DG	2970 Rampart Range Road 0.2" in 30 Minutes Rainfall	7/21/2015 14:45
3010	EPC at Hwy 105 Precipitation-DG	Douglas County 10 minute rainfall	7/21/2015 15:16
3010	EPC at Hwy 105 Precipitation-DG	Douglas County 1 hour-1 Inch rainfall	7/21/2015 15:19
2940	Willow Creek Precipitation-DG	Douglas County 10 minute rainfall	7/21/2015 15:23
2890	Spruce Mountain Open Space Precip-DG	Douglas County 10 minute rainfall	7/21/2015 15:26
2890	Spruce Mountain Open Space Precip-DG	Douglas County 1 hour-1 Inch rainfall	7/21/2015 15:34
2890	Spruce Mountain Open Space Precip-DG	Douglas County 10 minute rainfall	7/21/2015 15:37
2790	West Cherry Creek Precipitation-DG	Douglas County 10 minute rainfall	7/21/2015 15:46
2920	West Cherry Head Precipitation-DG	Douglas County 10 minute rainfall	7/21/2015 15:48
2910	East Cherry Creek Road Precipitation-DG	Douglas County 10 minute rainfall	7/21/2015 15:54
2910	East Cherry Creek Road Precipitation-DG	Douglas County 1 hour-1 Inch rainfall	7/21/2015 16:01
2920	West Cherry Head Precipitation-DG	Douglas County 1 hour-1 Inch rainfall	7/21/2015 16:03
630	Temple Pond at DTC Precipitation-DN	Plains 10 minute rainfall	7/27/2015 0:48
630	Temple Pond at DTC Precipitation-DN	Plains 1 hour rainfall	7/27/2015 0:50
630	Temple Pond at DTC Precipitation-DN	Plains 10 minute rainfall	7/27/2015 0:59
630	Temple Pond at DTC Precipitation-DN	Plains 2 hour rainfall	7/27/2015 1:08
630	Temple Pond at DTC Precipitation-DN	Plains 10 minute rainfall	7/27/2015 1:10
630	Temple Pond at DTC Precipitation-DN	Plains 24 hour rainfall	7/27/2015 1:20
630	Temple Pond at DTC Precipitation-DN	Plains 6 hour rainfall	7/27/2015 1:20
630	Temple Pond at DTC Precipitation-DN	Plains 10 minute rainfall	7/27/2015 1:22
5860	Cedar Mountain Precipitation-TL	Hayman 30 minute rainfall	7/29/2015 18:29
Sensor	Description	Alarm Type	Date
2260	Brook Forest Precipitation-JF	Tweet Jefferson County Heavy Rain 0.5"-10min	7/1/2015 14:39
2990	Tomah Road Precipitation-DG	Tweet Douglas County Heavy Rain 0.5"-10min	7/1/2015 15:48
2990	Tomah Road Precipitation-DG	Tweet Douglas County Heavy Rain 1"-1hour	7/1/2015 15:56
2990	Tomah Road Precipitation-DG	Tweet Douglas County Heavy Rain 0.5"-10min	7/1/2015 15:59
2940	Willow Creek Precipitation-DG	Tweet Douglas County Heavy Rain 0.5"-10min	7/1/2015 16:09
4790	Button Rock Precipitation-BO	Tweet Boulder County Heavy Rain 0.5"-10min	7/2/2015 18:57
2840	Sulphur Gulch Precipitation-DG	Tweet Douglas County Heavy Rain 0.5"-10min	7/2/2015 20:41
2250	Rosedale Precipitation-JF	Tweet Jefferson County Heavy Rain 0.5"-10min	7/5/2015 13:15
2250	Rosedale Precipitation-JF	Tweet Jefferson County Heavy Rain 1"-1hour	7/5/2015 13:25
2250	Rosedale Precipitation-JF	Tweet Jefferson County Heavy Rain 0.5"-10min	7/5/2015 13:26

100260	Trumbull Fire Station Wx Precipitation	Tweet Douglas County Heavy Rain 0.5"-10min	7/7/2015 14:48
2920	West Cherry Head Precipitation-DG	Tweet Douglas County Heavy Rain 0.5"-10min	7/9/2015 15:55
2920	West Cherry Head Precipitation-DG	Tweet Douglas County Heavy Rain 1"-1hour	7/9/2015 16:04
4770	Cal-Wood Ranch Precipitation-BO	Tweet Boulder County Heavy Rain 0.5"-10min	7/9/2015 17:25
4860	Fairview Peak Precipitation-BO	Tweet Boulder County Heavy Rain 0.5"-10min	7/9/2015 17:43
100	Carr Street Precipitation-JF-Arvada	Tweet Arvada Heavy Rain 1"-1hour	7/9/2015 19:30
100	Carr Street Precipitation-JF-Arvada	Tweet Jefferson County Heavy Rain 1"-1hour	7/9/2015 19:30
200	Leyden Reservoir Precipitation-JF-Arvada	Tweet Arvada Heavy Rain 0.5"-10min	7/9/2015 19:46
200	Leyden Reservoir Precipitation-JF-Arvada	Tweet Jefferson County Heavy Rain 0.5"-10min	7/9/2015 19:46
4040	Martin Gulch Precipitation-BO	Tweet Boulder County Heavy Rain 0.5"-10min	7/15/2015 15:53
940	Sampson Gulch Precipitation-AR	Tweet Arapahoe County Heavy Rain 0.5"-10min	7/15/2015 17:24
940	Sampson Gulch Precipitation-AR	Tweet Aurora Heavy Rain 0.5"-10min	7/15/2015 17:24
850	Flying J Truck Plaza Precipitation-AD	Tweet Aurora Heavy Rain 0.5"-10min	7/18/2015 15:17
830	Side Creek Park Precipitation-AR	Tweet Arapahoe County Heavy Rain 0.5"-10min	7/18/2015 15:29
830	Side Creek Park Precipitation-AR	Tweet Aurora Heavy Rain 0.5"-10min	7/18/2015 15:29
970	Pump Station 3 Precipitation-AR	Tweet Arapahoe County Heavy Rain 0.5"-10min	7/18/2015 15:53
970	Pump Station 3 Precipitation-AR	Tweet Aurora Heavy Rain 0.5"-10min	7/18/2015 15:53
3010	EPC at Hwy 105 Precipitation-DG	Tweet Douglas County Heavy Rain 0.5"-10min	7/21/2015 15:16
3010	EPC at Hwy 105 Precipitation-DG	Tweet Douglas County Heavy Rain 1"-1hour	7/21/2015 15:19
2940	Willow Creek Precipitation-DG	Tweet Douglas County Heavy Rain 0.5"-10min	7/21/2015 15:23
2890	Spruce Mountain Open Space Precip-DG	Tweet Douglas County Heavy Rain 0.5"-10min	7/21/2015 15:26
2890	Spruce Mountain Open Space Precip-DG	Tweet Douglas County Heavy Rain 1"-1hour	7/21/2015 15:34
2890	Spruce Mountain Open Space Precip-DG	Tweet Douglas County Heavy Rain 0.5"-10min	7/21/2015 15:37
2790	West Cherry Creek Precipitation-DG	Tweet Douglas County Heavy Rain 0.5"-10min	7/21/2015 15:46
2920	West Cherry Head Precipitation-DG	Tweet Douglas County Heavy Rain 0.5"-10min	7/21/2015 15:48
2910	East Cherry Creek Road Precipitation-DG	Tweet Douglas County Heavy Rain 0.5"-10min	7/21/2015 15:54
2910	East Cherry Creek Road Precipitation-DG	Tweet Douglas County Heavy Rain 1"-1hour	7/21/2015 16:01
2920	West Cherry Head Precipitation-DG	Tweet Douglas County Heavy Rain 1"-1hour	7/21/2015 16:03
630	Temple Pond at DTC Precipitation-DN	Tweet Denver Heavy Rain 0.5"-10min	7/27/2015 0:48
630	Temple Pond at DTC Precipitation-DN	Tweet Denver Heavy Rain 1"-1hour	7/27/2015 0:50
630	Temple Pond at DTC Precipitation-DN	Tweet Denver Heavy Rain 0.5"-10min	7/27/2015 0:59
630	Temple Pond at DTC Precipitation-DN	Tweet Denver Heavy Rain 0.5"-10min	7/27/2015 1:10
630	Temple Pond at DTC Precipitation-DN	Tweet Denver Heavy Rain 0.5"-10min	7/27/2015 1:22

General System Analysis

P:\A207-UDFCD-Data-Analysis\2015\07-2015\Novastar_extract_2015July.mdb

6/30/15 11:59 PM	Total Days	31.0
7/31/15 11:59 PM	Total Hours	744.0

Summarize

456,087

Concentrator	Percent	Legacy	Percent	ALERT2	Percent
163,070	35.75%	93,714	32.52%	120,386	36.67%
74,451	16.32%	39,946	13.86%	40,279	12.27%
66,796	14.65%	38,923	13.51%	38,718	11.79%
35,497	7.78%	21,208	7.36%	1,079	0.33%
33,411	7.33%	31,511	10.93%	30,079	9.16%
26,258	5.76%	14,437	5.01%	30,640	9.33%
22,010	4.83%	17,022	5.91%	24,111	7.34%
10,644	2.33%	10,639	3.69%	0	0.00%
5,892	1.29%	5,873	2.04%	0	0.00%
5,862	1.29%	5,824	2.02%	0	0.00%
3,725	0.82%	0	0.00%	10,476	3.19%
2,925	0.64%	2,907	1.01%	0	0.00%
2,038	0.45%	2,996	1.04%	0	0.00%
1,179	0.26%	1,146	0.40%	0	0.00%
735	0.16%	735	0.26%	0	0.00%
646	0.14%	0	0.00%	0	0.00%
395	0.09%	388	0.13%	2,908	0.89%
299	0.07%	285	0.10%	752	0.23%
109	0.02%	0	0.00%	10,694	3.26%
63	0.01%	63	0.02%	0	0.00%
51	0.01%	550	0.19%	0	0.00%
31	0.01%	31	0.01%	0	0.00%
0	0.00%	1	0.00%	0	0.00%
0	0.00%	0	0.00%	8,800	2.68%
0	0.00%	0	0.00%	8,777	2.67%
0	0.00%	0	0.00%	640	0.19%
456,087	100.00%	288,199	100.00%	328,339	100.00%

Concentrator		Legacy		ALERT2	
456,087		288,199		328,339	
14,253		9,297		10,592	
594		387		441	
591	hour beginning	375	hour beginning	433	hour beginning
1,257	Jul 21, 2:00 PM	824	Jul 8, 3:00 PM	627	Jul 9, 4:00 PM
1,172	Jul 8, 3:00 PM	820	Jul 9, 5:00 PM	592	Jul 8, 2:00 PM
1,115	Jul 9, 5:00 PM	800	Jul 21, 2:00 PM	583	Jul 21, 2:00 PM
1,092	Jul 8, 2:00 PM	781	Jul 8, 2:00 PM	558	Jul 30, 12:00 PM
1,043	Jul 21, 3:00 PM	757	Jul 8, 1:00 PM	557	Jul 29, 12:00 PM

Rain Timer Performance

Analyze Rain Sensors



Rain Sensors	Description	Rcv	Timer	Exp	Performance
2330	Morrison	27	17:15	64	42%
2360	Indian Hills	29	21:23	64	45%
1570	Wx-Brighton Ditch	31	12:00	64	48%
430	Utah Park	32	18:16	64	50%
2850	Cherry Cr bl Bayou Glch	34	16:19	64	53%
1660	SPR at Henderson	39	17:59	64	61%
1340	Sanderson at Xavier	40	12:17	64	63%
4330	Hansen Rain	44	14:57	64	69%
2280	Kinney Peak	44	14:45	64	69%
4870	SBC @ SB Road	44	16:48	64	69%
310	Guy Hill Ranch	45	13:30	64	70%
2350	Idledale	47	13:24	64	73%
1420	Wx-Diamond Hill	47	12:00	64	73%
2230	Bear Cr below Cub	48	14:50	64	75%
4510	Pinewood Springs	48	15:12	64	75%
4810	Shanahan Ridge	48	11:39	64	75%
4490	Apple Valley	49	13:08	64	77%
2790	Wx-W. Cherry Creek	49	13:34	64	77%
4270	Cannon Mountain	50	14:38	64	78%
2320	Choke Cherry Resvr	50	13:45	64	78%
2270	Cub Cr below Blue	50	13:12	64	78%
1710	Shop Creek	51	14:00	64	80%
4790	Wx-Button Rock	51	12:17	64	80%
2880	Happy Canyon at N Surrey Dr	52	11:58	64	81%
2820	Haskins Gulch Conf	52	12:58	64	81%
4850	Porphory Mtn	52	12:38	64	81%
1800	Sand Creek Park	52	13:40	64	81%
1360	Denver Zoo	53	12:53	64	83%
3030	WX-Bingham Lake Park	53	12:51	64	83%
2980	Dakan Rd	54	12:17	64	84%
500	Havana Park	54	12:28	64	84%
4290	Red Hill	54	13:13	64	84%
1620	Slaughterhouse Glch	54	12:46	64	84%
4570	St. Antons	54	12:18	64	84%
220	Upper Leyden	54	12:17	64	84%
120	West Woods	54	13:08	64	84%
100140	A2-Upper Sellers Gulch Precip	634		744	85%
2950	DC Public Works	55	12:00	64	86%
2340	El Rancho	55	13:00	64	86%
650	Iliff Pond	55	12:28	64	86%
4060	Lakeshore	55	12:35	64	86%
300	Van Bibber Park	55	12:30	64	86%
2710	Wx-Highlands Ranch WTP	55	11:56	64	86%
100150	A2-Sellers Gulch at Haystack Precip	644		744	87%
1350	Chatfield COE	56	12:35	64	88%
2870	Cottonwood (Apache)	56	12:06	64	88%
3050	East/West Trailhead	56	12:16	64	88%
4180	Gold Lake	56	12:51	64	88%
320	Sports Complex	56	12:12	64	88%
1530	Bear Creek @ Lowell	57	12:13	64	89%
1720	Cherry Cr @ Steele	57	12:40	64	89%
2240	Cold Sprg Glch conf	57	12:36	64	89%
3060	Fire Sta 47	57	12:15	64	89%
440	Fire Station #7	57	12:42	64	89%
600	Harvard Gulch Park	57	11:57	64	89%
710	Horseshoe Park Drop	57	12:12	64	89%
2960	Indian Creek	57	12:17	64	89%

1050	Jeffco Fairgrounds	57	12:11	64	89%
1550	Lakewood CC	57	12:28	64	89%
4040	Martin Gulch	57	11:57	64	89%
150	Nott Creek	57	12:32	64	89%
540	Parker/Mississippi	57	12:44	64	89%
4030	Red Garden	57	12:16	64	89%
830	Side Creek Park	57	12:44	64	89%
1320	SPR at 3rd Ave	57	12:30	64	89%
2890	Spruce Mt - Douglas	57	12:32	64	89%
2840	Sulphur Gulch	57	12:46	64	89%
630	Temple Pond at DTC	57	11:56	64	89%
1480	Third Creek at DIA	57	12:28	64	89%
510	Virginia Court	57	11:56	64	89%
4050	Walker Ranch	57	12:14	64	89%
1440	Wx-Elbert	57	12:31	64	89%
1520	Wx-Marston Lake North	57	12:48	64	89%
2930	Wx-Spring Valley Rd-DougCnty	57	12:49	64	89%
4550	Boulder Jail	58	12:29	64	91%
3040	CC @ Russelville Road Precip	58	12:16	64	91%
720	Confluence Pond	58	12:12	64	91%
4350	Conifer Hill	58	12:32	64	91%
4010	Crescent	58	12:13	64	91%
1010	Denver West	58	12:28	64	91%
4820	Doudy Draw	58	12:12	64	91%
820	ETG @ Buckley	58	12:13	64	91%
530	Fire Station #19	58	12:12	64	91%
4220	Fling's	58	12:14	64	91%
4230	Golden Age	58	12:13	64	91%
610	Harvard @ Jackson	58	12:27	64	91%
4360	Justice Center	58	11:57	64	91%
1310	LDC at 64th	58	12:27	64	91%
1040	Lena @ U.S. Hwy 6	58	12:15	64	91%
2810	Pine Cliff Road	58	12:32	64	91%
110	Ralston Reservoir	58	11:57	64	91%
800	Sable Ditch @ 18th	58	12:11	64	91%
4830	SBC @ San Souci	58	12:13	64	91%
4190	Slaughterhouse	58	12:14	64	91%
1640	SPR at Union Ave.	58	12:25	64	91%
330	Van Bibber @ Hwy 93	58	12:14	64	91%
2920	West Cherry Head-Douglas Cnty	58	12:15	64	91%
4530	Winiger Ridge	58	11:58	64	91%
140	Wx-Blue Mountain	58	12:34	64	91%
4750	Wx-Louisville Lake	58	12:15	64	91%
2990	Wx-Tomah Rd-DougCnty	58	12:52	64	91%
2260	Brook Forest	59	12:36	64	92%
4520	Eagle Ridge	59	12:15	64	92%
4100	Filter Plant	59	12:13	64	92%
2310	Genesee Village	59	11:56	64	92%
810	Granby Ditch @ 6th	59	12:12	64	92%
1300	Hidden Lake	59	12:27	64	92%
4310	Johnny Park	59	12:31	64	92%
410	Kelly Dam	59	11:42	64	92%
4320	Lee Hill Rain 2012	59	11:57	64	92%
760	Mission Viejo Park	59	12:11	64	92%
730	No Name @ Quincy	59	12:25	64	92%
950	Piney at Liverpool	59	12:11	64	92%
1500	Powers Park	59	12:20	64	92%
620	Quincy/Highline	59	12:12	64	92%
2370	Red Rocks Park	59	12:29	64	92%
4340	Riverside	59	12:14	64	92%
4130	Swiss Peaks	59	12:09	64	92%
2940	Willow Creek - DougCnty	59	12:00	64	92%
900	Wx-Aurora Reservoir	59	12:13	64	92%

1460	Wx-Urban Farm	59	12:00	64	92%
100100	A2-Blackstone Precip	60	12:00	64	94%
100110	A2-ETG @ Hampden Precip	60	12:00	64	94%
4110	Betasso	60	11:57	64	94%
4300	Big Elk Park	60	12:11	64	94%
2860	CC at Stroh Rd	60	11:57	64	94%
2910	East Cherry Cr-Douglas	60	12:16	64	94%
1600	Englewood Dam	60	12:12	64	94%
4860	Fairview Peak	60	12:00	64	94%
840	Fire Station 12	60	12:00	64	94%
4250	Geer Canyon	60	12:13	64	94%
640	Goldsmith @ Eastman	60	11:57	64	94%
1060	Heritage Square	60	11:57	64	94%
520	Jewell Detention	60	11:57	64	94%
210	Leyden Confluence	60	11:41	64	94%
4140	Logan Mill	60	12:15	64	94%
4090	Magnolia	60	11:58	64	94%
4020	Rio Grande	60	11:57	64	94%
4240	Sunset	60	11:57	64	94%
700	Toll Gate @ 6th	60	12:00	64	94%
4080	Twin Sisters	60	12:16	64	94%
4880	Whispering Pines	60	12:13	64	94%
920	Wx-Aurora Town Hall	60	12:00	64	94%
1920	Wx-Brighton	60	12:17	64	94%
4770	Wx-Cal-Wood Ranch	60	12:00	64	94%
750	Wx-Quincy Reservoir	60	11:56	64	94%
4710	Wx-Ward C-1	60	12:00	64	94%
3090	A2-Highland Heritage Park	61	12:00	64	95%
940	Aurora Regional Pond	61	11:57	64	95%
4070	Bear Peak	61	11:40	64	95%
1700	Cherry Cr @ Champa	61	11:43	64	95%
850	Flying J	61	12:00	64	95%
4150	Gold Hill	61	11:48	64	95%
1110	Gunbarrel	61	11:56	64	95%
4200	Lazy Acres	61	11:57	64	95%
4170	Pine Brook	61	11:57	64	95%
970	Pump Sta 3	61	12:00	64	95%
2250	Rosedale	61	11:57	64	95%
2900	Russelville Gulch-Douglas	61	12:00	64	95%
4160	Sunshine	61	11:57	64	95%
3080	Tallman Gulch	61	11:56	64	95%
4260	Taylor Mountain	61	11:41	64	95%
2750	Wx-Castle Rock	61	11:37	64	95%
2210	Wx-Hiwan G.C.	61	12:00	64	95%
2730	Wx-Salisbury Park	61	11:42	64	95%
4730	Wx-Sugarloaf	61	12:00	64	95%
200	Leyden Reservoir	62	11:42	64	97%
1030	NREL/S. Table Mtn.	62	11:42	64	97%
1400	Upper Sloan Det.	62	11:35	64	97%
1370	West Metro FS13	62	11:41	64	97%
3010	WX-EPC at Hwy 105	62	11:40	64	97%
1000	A2-Maple Grove Resv.	730		744	98%
870	A2-Murphy Creek GC	730		744	98%
100210	A2-South St Vrain at Berry Rain (not used)	730		744	98%
100240	A2-Westerly Cr Dam Precip	730		744	98%
100	A2-Carr Street	731		744	98%
100160	A2-Sand Creek at Colfax Precip	731		744	98%
100230	A2-Havana Pond Precip	732		744	98%
420	Expo Park	63	11:40	64	98%
3020	Wx-West Creek WX	63	11:23	64	98%
6601	A2-Magnolia WX-Precip	92	7:45	93	99%
1900	Niver Detention	65	11:18	64	102%
3070	A2-Newlin Gulch Precip	127	5:41	124	102%

1200	Broomfield 3207	66	11:00	64	103%
4840	SBC@S Boulder Ditch	66	11:00	64	103%
1100	Louisville Rec Ctr	125	5:11	124	101%
4470	Little Narrows	502		64	784%
2970	Rampart Range Rd-Satellite	271		248	109%
5720	Four Mile Creek	52	12:16	64	81%
5730	West Creek	61	11:43	64	95%
5740	Trail Creek	63	11:20	64	98%
5810	Stump Bump	62	11:44	64	97%
5860	Cedar Mountain	62	11:31	64	97%
5880	Hackett Mountain	61	11:50	64	95%
5900	Horse Creek-Satellite	1484		1484	100%
5940	Log Jumper	48	12:00	64	75%
100260	A2-Trumbull (Hayman) - Precip	315		744	42%
100270	A2-WestCreek (Hayman) - Precip	725		744	97%

Rain Event Performance		Reports Received	Reports Received	9,233	Analyze Rain Sensors						0	<<show stations with zero rain (1=yes, 0=no)							
		Systemwide Avg	Total Tips	9,827															
		93.96%	Data Loss	6.04%															
Description	Sensor	Performance	1-tips	2-tips	3-tips	4-tips	5-tips	6-tips	>6-tips	Rcv	Exp	Miss	Hold	Bucket					
Wx-W. Cherry Creek	2790	69%	42	11	4	0	2	0	0	59	86	27	0	0.03937					
Utah Park	430	72%	64	5	3	0	0	0	0	72	100	28	0	0.03937	Mean		54.59444		
Indian Hills	2360	72%	24	8	1	1	0	0	0	34	47	13	0	0.03937	Median		53		
SBC @ SB Road	4870	75%	38	11	3	0	0	0	0	52	69	17	0	0.03937	St. Dev		24.78842		
Cherry Cr bl Bayou Glch	2850	79%	22	3	2	0	0	0	0	27	34	7	0	0.03937	Mean plus 3 SD		128.9597		
Hansen Rain	4330	80%	50	6	0	0	0	0	0	56	70	14	0	0.03937	Min		1		
SPR at Henderson	1660	80%	57	9	1	2	0	0	0	69	86	17	0	0.03937	Max		127		
Guy Hill Ranch	310	81%	32	4	1	1	0	0	0	38	47	9	0	0.03937	Mean minus 2 SD		5.017599		
Idledale	2350	81%	27	6	1	0	0	0	0	34	42	8	0	0.03937					
Jeffco Fairgrounds	1050	81%	10	3	0	0	0	0	0	13	16	3	1	0.03937					
Morrison	2330	81%	27	8	0	0	0	0	0	35	43	8	0	0.03937					
Rampart Range Rd-Satellite	2970	82%	58	6	1	1	1	0	0	67	82	15	0	0.03937					
Choke Cherry Resvr	2320	82%	55	7	2	1	0	0	0	65	79	14	0	0.03937					
Quincy/Highline	620	83%	19	5	0	0	0	0	0	24	29	5	0	0.03937					
Harvard @ Jackson	610	83%	26	2	0	0	1	0	0	29	35	6	0	0.03937					
Apple Valley	4490	83%	22	2	0	1	0	0	0	25	30	5	0	0.03937					
Pinewood Springs	4510	84%	47	2	4	0	0	0	0	53	63	10	0	0.03937					
Slaughterhouse Glch	1620	84%	13	3	0	0	0	0	0	16	19	3	0	0.03937					
Cub Cr below Blue	2270	85%	60	11	1	0	0	0	0	72	85	13	0	0.03937					
Chatfield COE	1350	86%	27	3	1	0	0	0	0	31	36	5	0	0.03937					
Cherry Cr @ Champa	1700	86%	16	3	0	0	0	0	0	19	22	3	0	0.03937					
West Cherry Head-Douglas Cnty	2920	87%	79	12	1	0	0	0	0	92	106	14	0	0.03937					
A2-Upper Sellers Gulch Precip	100140	87%	41	4	0	1	0	0	0	46	53	7	1	0.03937					
Jewell Detention	520	87%	25	0	2	0	0	0	0	27	31	4	0	0.03937					
Wx-Salisbury Park	2730	87%	29	5	0	0	0	0	0	34	39	5	0	0.03937					
Red Rocks Park	2370	88%	38	6	0	0	0	0	0	44	50	6	0	0.03937					
Wx-Button Rock	4790	88%	46	7	0	0	0	0	0	53	60	7	0	0.03937					
Wx-Tomah Rd-DougCnty	2990	88%	90	7	3	0	0	0	0	100	113	13	0	0.03937					
Willow Creek - DougCnty	2940	89%	63	6	0	1	0	0	0	70	79	9	0	0.03937					
Russelville Gulch-Douglas	2900	89%	43	4	1	0	0	0	0	48	54	6	0	0.03937					
Tallman Gulch	3080	89%	44	4	1	0	0	0	0	49	55	6	0	0.03937					
Sulphur Gulch	2840	89%	37	5	0	0	0	0	0	42	47	5	0	0.03937					
Little Narrows	4470	89%	37	5	0	0	0	0	0	42	47	5	0	0.03937					
Lee Hill Rain 2012	4320	90%	85	1	0	0	0	0	1	86	96	10	0	0.03937					
A2-Sellers Gulch at Haystack Precip	100150	90%	32	2	1	0	0	0	0	35	39	4	0	0.03937					
Dakan Rd	2980	90%	67	8	0	0	0	0	0	75	83	8	0	0.03937					
Red Hill	4290	90%	51	6	0	0	0	0	0	57	63	6	0	0.03937					
A2-Westerly Cr Dam Precip	100240	91%	27	1	1	0	0	0	0	29	32	3	0	0.03937					
CC at Stroh Rd	2860	91%	37	4	0	0	0	0	0	41	45	4	0	0.03937					
Ralston Reservoir	110	91%	58	6	0	0	0	0	0	64	70	6	0	0.03937					
CC @ Russelville Road Precip	3040	91%	60	2	2	0	0	0	0	64	70	6	0	0.03937					
Wx-Cal-Wood Ranch	4770	91%	68	7	0	0	0	0	0	75	82	7	0	0.03937					
Horseshoe Park Drop	710	92%	21	0	1	0	0	0	0	22	24	2	0	0.03937					
Third Creek at DIA	1480	92%	51	5	0	0	0	0	0	56	61	5	0	0.03937					
Nott Creek	150	92%	57	2	0	1	0	0	0	60	65	5	0	0.03937					
Wx-Diamond Hill	1420	92%	33	3	0	0	0	0	0	36	39	3	0	0.03937					
Golden Age	4230	92%	56	3	1	0	0	0	0	60	65	5	0	0.03937					
Cannon Mountain	4270	92%	66	6	0	0	0	0	0	72	78	6	0	0.03937					
Broomfield 3207	1200	92%	46	2	1	0	0	0	0	49	53	4	0	0.03937					
Lakewood CC	1550	93%	23	2	0	0	0	0	0	25	27	2	0	0.03937					
Taylor Mountain	4260	93%	63	3	1	0	0	0	0	67	72	5	0	0.03937					
Niver Detention	1900	93%	39	1	1	0	0	0	0	41	44	3	0	0.03937					
East Cherry Cr-Douglas	2910	93%	90	7	0	0	0	0	0	97	104	7	0	0.03937					
Spruce Mt - Douglas	2890	93%	66	5	0	0	0	0	0	71	76	5	0	0.03937					
Conifer Hill	4350	93%	67	3	1	0	0	0	0	71	76	5	0	0.03937					
A2-Havana Pond Precip	100230	94%	27	2	0	0	0	0	0	29	31	2	0	0.03937					
Justice Center	4360	94%	56	2	1	0	0	0	0	59	63	4	0	0.03937					
Leyden Confluence	210	94%	47	3	0	0	0	0	0	50	53	3	0	0.03937					
LDC at 64th	1310	94%	114	5	1	0	0	0	0	120	127	7	0	0.03937					
Upper Leyden	220	95%	65	4	0	0	0	0	0	69	73	4	1	0.03937					
Kelly Dam	410	95%	33	2	0	0	0	0	0	35	37	2	0	0.03937					
Flying J	850	95%	66	4	0	0	0	0	0	70	74	4	1	0.03937					

Pine Cliff Road	2810	95%	50	3	0	0	0	0	0	0	53	56	3	0	0.03937
Leyden Reservoir	200	95%	51	3	0	0	0	0	0	0	54	57	3	1	0.03937
Genesee Village	2310	95%	52	3	0	0	0	0	0	0	55	58	3	0	0.03937
SBC @ San Souci	4830	95%	52	3	0	0	0	0	0	0	55	58	3	0	0.03937
Sable Ditch @ 18th	800	95%	35	2	0	0	0	0	0	0	37	39	2	0	0.03937
Kinney Peak	2280	95%	54	1	1	0	0	0	0	0	56	59	3	0	0.03937
Iliff Pond	650	95%	18	1	0	0	0	0	0	0	19	20	1	0	0.03937
Mission Viejo Park	760	95%	18	1	0	0	0	0	0	0	19	20	1	0	0.03937
Heritage Square	1060	95%	18	1	0	0	0	0	0	0	19	20	1	0	0.03937
Bear Peak	4070	95%	74	2	1	0	0	0	0	0	77	81	4	0	0.03937
Lakeshore	4060	95%	55	3	0	0	0	0	0	0	58	61	3	0	0.03937
Geer Canyon	4250	95%	55	3	0	0	0	0	0	0	58	61	3	0	0.03937
Shanahan Ridge	4810	95%	37	2	0	0	0	0	0	0	39	41	2	0	0.03937
Virginia Court	510	95%	57	3	0	0	0	0	0	0	60	63	3	0	0.03937
WX-Bingham Lake Park	3030	95%	39	2	0	0	0	0	0	0	41	43	2	0	0.03937
Bear Cr below Cub	2230	95%	59	3	0	0	0	0	0	0	62	65	3	0	0.03937
Crescent	4010	95%	59	3	0	0	0	0	0	0	62	65	3	0	0.03937
Powers Park	1500	95%	81	2	1	0	0	0	0	0	84	88	4	0	0.03937
West Woods	120	96%	61	3	0	0	0	0	0	0	64	67	3	0	0.03937
Walker Ranch	4050	96%	62	3	0	0	0	0	0	0	65	68	3	0	0.03937
Denver Zoo	1360	96%	42	2	0	0	0	0	0	0	44	46	2	0	0.03937
SPR at Union Ave.	1640	96%	21	1	0	0	0	0	0	0	22	23	1	0	0.03937
Winiger Ridge	4530	96%	85	2	1	0	0	0	0	0	88	92	4	0	0.03937
Wx-Marston Lake North	1520	96%	24	1	0	0	0	0	0	0	25	26	1	0	0.03937
Shop Creek	1710	96%	24	1	0	0	0	0	0	0	25	26	1	2	0.03937
Van Bibber Park	300	96%	49	2	0	0	0	0	0	0	51	53	2	0	0.03937
Gold Lake	4180	96%	75	1	1	0	0	0	0	0	77	80	3	0	0.03937
Louisville Rec Ctr	1100	96%	51	0	1	0	0	0	0	0	52	54	2	0	0.03937
Wx-Brighton	1920	96%	25	1	0	0	0	0	0	0	26	27	1	0	0.03937
DC Public Works	2950	96%	26	1	0	0	0	0	0	0	27	28	1	0	0.03937
A2-Highland Heritage Park	3090	96%	26	1	0	0	0	0	0	0	27	28	1	0	0.03937
Rosedale	2250	96%	105	4	0	0	0	0	0	0	109	113	4	0	0.03937
Wx-Aurora Town Hall	920	97%	55	2	0	0	0	0	0	0	57	59	2	0	0.03937
West Metro FS13	1370	97%	55	2	0	0	0	0	0	0	57	59	2	0	0.03937
Slaughterhouse	4190	97%	83	3	0	0	0	0	0	0	86	89	3	0	0.03937
Pump Sta 3	970	97%	56	2	0	0	0	0	0	0	58	60	2	1	0.03937
Upper Sloan Det.	1400	97%	28	1	0	0	0	0	0	0	29	30	1	0	0.03937
Wx-Urban Farm	1460	97%	28	1	0	0	0	0	0	0	29	30	1	1	0.03937
Lazy Acres	4200	97%	57	2	0	0	0	0	0	0	59	61	2	0	0.03937
El Rancho	2340	97%	87	3	0	0	0	0	0	0	90	93	3	0	0.03937
St. Antons	4570	97%	87	3	0	0	0	0	0	0	90	93	3	0	0.03937
Toll Gate @ 6th	700	97%	30	1	0	0	0	0	0	0	31	32	1	0	0.03937
Doudy Draw	4820	97%	61	2	0	0	0	0	0	0	63	65	2	0	0.03937
Indian Creek	2960	97%	32	1	0	0	0	0	0	0	33	34	1	0	0.03937
Martin Gulch	4040	97%	66	0	1	0	0	0	0	0	67	69	2	0	0.03937
Havana Park	500	97%	70	2	0	0	0	0	0	0	72	74	2	0	0.03937
Fire Sta 47	3060	97%	35	1	0	0	0	0	0	0	36	37	1	0	0.03937
Filter Plant	4100	97%	71	2	0	0	0	0	0	0	73	75	2	0	0.03937
Goldsmith @ Eastman	640	97%	36	1	0	0	0	0	0	0	37	38	1	0	0.03937
Granby Ditch @ 6th	810	97%	36	1	0	0	0	0	0	0	37	38	1	0	0.03937
NREL/S. Table Mtn.	1030	97%	36	1	0	0	0	0	0	0	37	38	1	0	0.03937
Sand Creek Park	1800	97%	36	1	0	0	0	0	0	0	37	38	1	0	0.03937
Boulder Jail	4550	97%	36	1	0	0	0	0	0	0	37	38	1	0	0.03937
Aurora Regional Pond	940	97%	36	1	0	0	0	0	0	0	37	38	1	0	0.03937
Fling's	4220	97%	73	2	0	0	0	0	0	0	75	77	2	0	0.03937
Riverside	4340	97%	73	2	0	0	0	0	0	0	75	77	2	0	0.03937
Side Creek Park	830	98%	40	1	0	0	0	0	0	0	41	42	1	0	0.03937
Fire Station 12	840	98%	41	1	0	0	0	0	0	0	42	43	1	1	0.03937
Van Bibber @ Hwy 93	330	98%	43	1	0	0	0	0	0	0	44	45	1	0	0.03937
Harvard Gulch Park	600	98%	44	1	0	0	0	0	0	0	45	46	1	0	0.03937
Wx-Blue Mountain	140	98%	46	1	0	0	0	0	0	0	47	48	1	0	0.03937
Hidden Lake	1300	98%	46	1	0	0	0	0	0	0	47	48	1	0	0.03937
Wx-Louisville Lake	4750	98%	48	1	0	0	0	0	0	0	49	50	1	0	0.03937
Sports Complex	320	98%	50	1	0	0	0	0	0	0	51	52	1	0	0.03937
Red Garden	4030	98%	51	1	0	0	0	0	0	0	52	53	1	0	0.03937
Brook Forest	2260	98%	105	2	0	0	0	0	0	0	107	109	2	0	0.03937
Wx-Ward C-1	4710	98%	106	2	0	0	0	0	0	0	108	110	2	0	0.03937

SBC@S Boulder Ditch	4840	98%	55	1	0	0	0	0	0	0	56	57	1	1	0.03937
Lena @ U.S. Hwy 6	1040	98%	56	1	0	0	0	0	0	0	57	58	1	0	0.03937
Wx-Spring Valley Rd-DougCnty	2930	98%	56	1	0	0	0	0	0	0	57	58	1	0	0.03937
Rio Grande	4020	98%	56	1	0	0	0	0	0	0	57	58	1	0	0.03937
Cold Sprg Glch conf	2240	98%	58	1	0	0	0	0	0	0	59	60	1	0	0.03937
Wx-West Creek WX	3020	98%	58	1	0	0	0	0	0	0	59	60	1	0	0.03937
Expo Park	420	99%	74	1	0	0	0	0	0	0	75	76	1	0	0.03937
Wx-Elbert	1440	99%	80	1	0	0	0	0	0	0	81	82	1	0	0.03937
Sunshine	4160	99%	80	1	0	0	0	0	0	0	81	82	1	0	0.03937
Magnolia	4090	99%	83	1	0	0	0	0	0	0	84	85	1	0	0.03937
Betasso	4110	99%	86	1	0	0	0	0	0	0	87	88	1	0	0.03937
A2-Carr Street	100	100%	69	0	0	0	0	0	0	0	69	69	0	0	0.03937
Fire Station #7	440	100%	30	0	0	0	0	0	0	0	30	30	0	0	0.03937
Fire Station #19	530	100%	41	0	0	0	0	0	0	0	41	41	0	0	0.03937
Parker/Mississippi	540	100%	28	0	0	0	0	0	0	0	28	28	0	0	0.03937
Confluence Pond	720	100%	15	0	0	0	0	0	0	0	15	15	0	0	0.03937
No Name @ Quincy	730	100%	24	0	0	0	0	0	0	0	24	24	0	0	0.03937
Wx-Quincy Reservoir	750	100%	22	0	0	0	0	0	0	0	22	22	0	0	0.03937
ETG @ Buckley	820	100%	27	0	0	0	0	0	0	0	27	27	0	0	0.03937
A2-Murphy Creek GC	870	100%	25	0	0	0	0	0	0	0	25	25	0	0	0.03937
Piney at Liverpool	950	100%	17	0	0	0	0	0	0	0	17	17	0	0	0.03937
A2-Maple Grove Resv.	1000	100%	26	0	0	0	0	0	0	0	26	26	0	0	0.03937
Denver West	1010	100%	34	0	0	0	0	0	0	0	34	34	0	0	0.03937
Gunbarrel	1110	100%	27	0	0	0	0	0	0	0	27	27	0	0	0.03937
SPR at 3rd Ave	1320	100%	30	0	0	0	0	0	0	0	30	30	0	0	0.03937
Sanderson at Xavier	1340	100%	1	0	0	0	0	0	0	0	1	1	0	0	0.03937
Bear Creek @ Lowell	1530	100%	32	0	0	0	0	0	0	0	32	32	0	0	0.03937
Englewood Dam	1600	100%	45	0	0	0	0	0	0	0	45	45	0	0	0.03937
Cherry Cr @ Steele	1720	100%	18	0	0	0	0	0	0	0	18	18	0	0	0.03937
Wx-Hiwan G.C.	2210	100%	106	0	0	0	0	0	0	0	106	106	0	1	0.03937
Wx-Highlands Ranch WTP	2710	100%	55	0	0	0	0	0	0	0	55	55	0	0	0.03937
Wx-Castle Rock	2750	100%	32	0	0	0	0	0	0	0	32	32	0	0	0.03937
Haskins Gulch Conf	2820	100%	34	0	0	0	0	0	0	0	34	34	0	0	0.03937
Cottonwood (Apache)	2870	100%	29	0	0	0	0	0	0	0	29	29	0	0	0.03937
Happy Canyon at N Surrey Dr	2880	100%	36	0	0	0	0	0	0	0	36	36	0	0	0.03937
East/West Trailhead	3050	100%	30	0	0	0	0	0	0	0	30	30	0	0	0.03937
A2-Newlin Gulch Precip	3070	100%	23	0	0	0	0	0	0	0	23	23	0	0	0.03937
Twin Sisters	4080	100%	91	0	0	0	0	0	0	0	91	91	0	0	0.03937
Logan Mill	4140	100%	77	0	0	0	0	0	0	0	77	77	0	0	0.03937
Gold Hill	4150	100%	101	0	0	0	0	0	0	0	101	101	0	0	0.03937
Pine Brook	4170	100%	72	0	0	0	0	0	0	0	72	72	0	0	0.03937
Sunset	4240	100%	86	0	0	0	0	0	0	0	86	86	0	0	0.03937
Big Elk Park	4300	100%	78	0	0	0	0	0	0	0	78	78	0	0	0.03937
Johnny Park	4310	100%	64	0	0	0	0	0	0	0	64	64	0	1	0.03937
Eagle Ridge	4520	100%	27	0	0	0	0	0	0	0	27	27	0	1	0.03937
Wx-Sugarloaf	4730	100%	76	0	0	0	0	0	0	0	76	76	0	0	0.03937
Whispering Pines	4880	100%	70	0	0	0	0	0	0	0	70	70	0	0	0.03937
A2-Blackstone Precip	100100	100%	32	0	0	0	0	0	0	0	32	32	0	0	0.03937
A2-ETG @ Hampden Precip	100110	100%	16	0	0	0	0	0	0	0	16	16	0	0	0.03937
A2-Sand Creek at Colfax Precip	100160	100%	48	0	0	0	0	0	0	0	48	48	0	0	0.03937
Wx-Aurora Reservoir	900	100%	19	0	0	0	0	0	0	0	19	19	0	0	0.03937
		Total Tips	8757	410	52	10	4	0	0	4	9233	9827	594	14	
WX-EPC at Hwy 105	3010	80%	255	40	8	6	1	0	0	6	310	388	78	0	0.01
Porphory Mtn	4850	79%	221	37	11	3	1	0	0	0	273	345	72	51	0.01
Fairview Peak	4860	89%	311	19	5	0	3	0	0	0	338	379	41	42	0.01
A2-Magnolia WX-Precip	6601	95%	358	12	2	1	0	0	0	0	373	392	19	16	0.01
Temple Pond at DTC	630	35%	85	3	0	0	0	0	0	1	88	252	164	0	0.03937
Four Mile Creek	5720	95%	52	3	0	0	0	0	0	0	55	58	3	0	0.03937
West Creek	5730	99%	96	1	0	0	0	0	0	0	97	98	1	0	0.03937
Trail Creek	5740	93%	113	5	2	0	0	0	0	0	120	129	9	1	0.03937
Stump Bump	5810	98%	86	2	0	0	0	0	0	0	88	90	2	0	0.03937
Cedar Mountain	5860	98%	122	2	0	0	0	0	0	0	124	126	2	0	0.03937
Hackett Mountain	5880	93%	92	6	1	0	0	0	0	0	99	107	8	0	0.03937
Horse Creek-Satellite	5900	100%	61	0	0	0	0	0	0	0	61	61	0	0	0.03937
Log Jumper	5940	76%	55	10	0	1	1	1	0	0	68	90	22	0	0.03937

A2-Trumbull (Hayman) - Precip	100260	63%	34	6	2	3	1	1	1	47	75	28	0	0.03937		
A2-WestCreek (Hayman) - Precip	100270	94%	75	5	0	0	0	0	0	80	85	5	0	0.03937		

2015 Monthly Peak Hour ALERT Radio Traffic Summary

